

REMARKS/ARGUMENTS

Provisional Rejections For Obviousness-Type Double Patenting.

Applicant submitted a Terminal Disclaimer on October 17, 2003 for co-pending U.S. Application Serial Nos. 10/060,418, 10/060,859, 10/060,963, 10/061,079, and 10/061,080, filed on January 29, 2002. Applicants submit a supplemental Terminal Disclaimer for co-pending U.S. Application Serial No. 09/877,405, filed on June 8, 2001 and U.S. Application Serial Nos. 10/060,872, 10/060,955, 10/060,861 and 10/060,853, filed on January 29, 2002. Since these other co-pending applications were not addressed in the October 17, 2003 Terminal Disclaimer, Applicant believes that the previously filed Terminal Disclaimer and the attached Terminal Disclaimer address all of the obviousness-type double patenting rejections raised by the Examiner in the various related cases.

Rejection Under 35 USC 102(e) and 103 - Kellogg.

The Examiner rejects claims 1, 27 and 56 under 35 USC 102(e) as being anticipated by U.S. Patent No. 6,527,432 to Kellogg et al., hereinafter referred to as "Kellogg." The Examiner also rejects claims 2-26, 28-55, and 57-60 under 35 USC 103(a) as being unpatentable over Kellogg.

A. Measurement Channel and Two Axes of Rotation

All of the independent claims specify a device comprising an inlet chamber, a measurement channel in fluid communication with the inlet chamber, and an experiment chamber where fluid is transported from the inlet chamber to the measurement channel by rotating the device about a first axis and is transported from the measurement channel to the experiment chamber by rotating the device about a second axis. See Specification, page 61, line 10 to page 63, line 15 regarding the function and operation of the device.

Kellogg, by contrast, only teaches rotating the device about a single axis and does not teach or suggest using a measurement channel as claimed. All of the independent claims are clearly patentable over Kellogg in view of these distinctions.

B. Performing Crystallization Experiments

Kellogg is also distinguished by independent claims 56, 71 and 72 and dependent claims 84-86 in regard to the use of the device to perform crystallization experiments, particularly protein crystallizations. Kellogg neither teaches nor suggests using a microfluidic device to form crystallization experiments where fluid is moved within the device by rotating the device.

Kellogg addresses the problem of mixing small volumes and teaches that the benefit of the device described therein increases as the sample volume increases. Specifically, Kellogg teaches at Col. 9, lines 20-30 that the expected time for diffusion based mixing of two volumes of 4 μL is over 2 hours whereas the expected time for diffusion based mixing of two volumes of 100nL is 10 minutes. The notion of larger volumes is reinforced by the teaching of Kellogg at Col. 11, lines 44-45 that “the entry ports were sized to easily accommodate a plastic pipette tip and to allow air to escape as fluid was dispensed into the device” and by Example 1 which employs 12 μL of sample. This teaching would motivate one to look to the device of Kellogg for applications where larger sample volumes need to be mixed.

By contrast to Kellogg which addresses the problem of mixing small volumes, the present invention is focused on consistently delivering small volumes including submicroliter volumes to experiment chambers of a microfluidic device. One particular application for delivering small volumes is for performing crystallizations. Unlike Kellogg whose mixing problem increases as sample volumes increase, one of the problems addressed by the present invention, i.e., delivering smaller and smaller volumes for crystallizations, increases as sample volumes decrease. In view of Kellogg’s failure to teach or suggest using a microfluidic device to form crystallization experiments and Kellogg’s relative incompatibility with performing crystallization experiments, the claims directed to using a device to conduct crystallizations are clearly patentable over Kellogg.

C. Use of Measurement Channel to Transfer Precise Amounts of Fluid

Kellogg is further distinguished by dependent claims 19-24, 45-50 and 78-83 in regard to the precision with which volumes of fluid are transferred to the experiment chamber via the measurement channel. The device of Kellogg is focused on facilitating mixing and does not provide a mechanism whereby the device itself measures out how much fluid is transferred to

different chambers within the device. By contrast, the above dependent claims point out a feature of the present invention that the measurement channel serves to control how much fluid from the inlet chamber is transferred to the experiment chamber via the measurement channel. See Specification, page 61, lines 23-27 and page 62, lines 10-12. The recited dependent claims further distinguish Kellogg in this regard.

D. Waste Channel and Waste Chamber

Kellogg is also distinguished by dependent claim 61 in regard to the use of a waste channel and a waste reservoir. See Specification, page 61, line 10 to page 63, line 15. As noted above, the device of Kellogg is focused on facilitating mixing and does not provide a mechanism whereby the device itself measures out how much fluid is transferred to different chambers within the device. Accordingly, Kellogg fails to teach measuring fluids via a measurement channel and getting rid of the excess via a waste channel and a waste reservoir by a separate spin of the device. The recited dependent claim further distinguishes Kellogg in this regard.

Applicant submits that all of the pending claims as amended are patentable over Kellogg for the various reasons set forth above as well as further distinctions over Kellogg that Applicant could readily make. The Examiner is therefore respectfully requested to withdraw this ground of rejection.

CONCLUSION

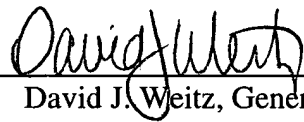
In light of the remarks set forth above, Applicant earnestly believes that he is entitled to a letters patent, and respectfully solicits the Examiner to expedite prosecution of this patent application to issuance. Should the Examiner have any questions, the Examiner is encouraged to telephone the undersigned.

Respectfully submitted,

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By: _____



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